

The cream, being thicker, does not run from the cream outlet as freely, decreasing the capacity of the cream outlet, causing more skim-milk to be taken from the cream; therefore the test is increased.

Richness of Milk Separated. When the cream screw is set to deliver a certain per cent. of fat in the cream, under normal conditions there will be a definite ratio between the skim-milk and cream separated. That is, if the separator delivers 12 pounds of cream and 88 pounds of skim-milk from 100 pounds of 3% milk, the test of the cream would be 25%. On the other hand, if 100 pounds of 4% milk is separated, under the same conditions, instead of getting a greater weight of cream than from the 3% milk, we would get approximately the same weight, viz. 12 pounds, but it would test about 33% fat. The change in the per cent. of fat in milk is caused by several factors, one of which is the change from dry to succulent pastures, which results in a decreased fat percentage. However, a gain in pounds of butter-fat would be accounted for by the increase of pounds of milk produced. As cows advance in their lactation period, the percentage of fat increases.

The Amount of Skim-Milk or Water Used in Flushing the Separator Bowl. If just enough flushing is used to discharge the cream remaining in the separator bowl, the per cent. of fat in the cream will not be materially changed. When an excess of either is used, the test of the cream is lowered considerably. Pour the flush water or milk in the supply tank before removing the float. Do not pour the flush water or skim-milk directly into the bowl, as the machine is not able to handle the rapid flow, therefore lowering the per cent. of fat. A decrease of from 1 to 10 per cent. in fat in cream may be caused by variation in the amount of flush water or skim-milk used.

The proper cleaning of the separator after each separation is of great importance. The mere running of warm water through the machine after separation is not sufficient cleaning to insure first grade cream. The separator should be taken apart and thoroughly cleaned and scalded after each separation.

A separator that is not kept level, causing vibration, cannot do efficient work, and much fat is lost in the skim-milk.

MANITOBA DEPARTMENT of AGRICULTURE

Dairy Branch

WINNIPEG, MANITOBA, MAY, 1925

Cream that is Worth More Money

L. A. GIBSON, *Dairy Commissioner*

Cream is now bought strictly on grade by all Manitoba creameries, and in view of the greater prices paid for the higher grades, it pays to ship cream in the best possible condition.

"Special Grade" cream is worth at least 5c more per pound fat than "No. 2," and this means from \$1.40 to \$1.60 on every eight-gallon can of cream shipped. The higher grades of cream make the best butter. Low grade cream inevitably means low grade butter; nobody on earth can make high grade butter from low grade cream.

Practically all cream is good at the start, unless tainted by weeds. Healthy, properly fed cows, kept and milked in a clean place, always give milk of high quality. The deterioration is nearly always caused by the methods of handling. Every farmer's cream would go into the top grades, with little or no extra expense, if carried through to the grader according to the instructions given in this circular.

The future expansion of Manitoba's dairy industry depends upon our export trade. To meet competition on the British market, we must ship the higher grades of butter. The export market does not want low grade butter; neither does our home market. Quality in our

By Authority of Hon. A. Prefontaine, Minister of Agriculture
and Immigration.

butter is absolutely necessary to success under any condition. Each pound of high grade butter used increases the consumptive demand for butter. Quality is the most effective advertising medium; in fact, it is an absolute necessity for the permanence of the business.

Every farmer can produce "Special" or "First Grade" cream by reasonable attention to the following simple and fundamental requirements:

- 1—Cooling the cream promptly; then keeping it cold.
- 2—Cleanliness of the separator and utensils.
- 3—Frequency of delivery.

GRADE STANDARDS

The grades set forth below are legal, being set by Order-in-Council. Identical grades are in use in Manitoba, Saskatchewan and Alberta.

TABLE CREAM—This grade shall include any lot of sweet, clean-flavored, non-frozen cream bought for resale for household use. The acidity of this cream shall not be more than twenty one-hundredths (.20%) of one per cent. at the time of grading.

This cream shall be produced under conditions that comply with the special requirements of the municipality in which it is to be sold for consumption.

SPECIAL GRADE—This grade shall include any lot of cream which is clean in flavor, of uniform consistency and suitable for making butter of this grade. Its acidity shall not be more than thirty one-hundredths (.30%) of one per cent. at the time of its being graded at the creamery where it is to be made into butter.

FIRST GRADE—This grade shall include any lot of cream which is reasonably clean in flavor, of uniform consistency and suitable for making butter of this grade. Its acidity shall not be more than sixty one-hundredths (.60%) of one per cent. at the time of its being graded at the creamery where it is to be made into butter.

SECOND GRADE—This grade shall include any cream that does not meet the requirements specified for the next higher grade; such as cream that is bitter, stale, musty, metallic or otherwise unclean in flavor.

OFF GRADE—This grade shall include any cream with an objectionable odor or flavor, such as kerosene, gasoline, stinkweed, onions or such other flavors that may render cream unfit for making into Number Two butter.

HOW TO PRODUCE THE HIGHEST GRADE OF CREAM

This is a list of instructions to some, and simply a reminder to others.

- 1—Milk the cows in clean surroundings.
- 2—Give cows abundance of pure water.
- 3—Keep salt before the cows at all times.
- 4—Never feed cows musty feed.
- 5—See that cows' udders are clean before milking.
- 6—Use good tinware. Rusty pails and cans will produce metallic flavors and should not be used.
- 7—Separate the milk promptly while fresh and warm.
- 8—Keep the separator in a clean place and wash it thoroughly every time it is used.
- 9—Skim a cream testing between 30 and 40% fat, preferably 35%. Thin cream sours quickly.
- 10—To clean dairy utensils: Rinse with warm water; wash with hot water containing washing powder; never use soap; use a brush—never use a cloth; scald thoroughly and drain in the sunlight.
- 11—After separating, but before pouring into the shipping can, cool the cream to 50°F. or below in a shot-gun can or other small can. This is important.

(See suggestion regarding cooling tank on page 5). Stir the cream well when it is added to the shipping can, and place it in the cooling tank or ice well. Stir with a cream stirrer each time a fresh lot of cream is added.

12—Never mix warm cream with cooled cream.

13—Deliver the cream frequently—twice per week, or, better still, three times per week. Sour and undesirable flavors increase with the age of the cream.

14—Never let cream freeze.

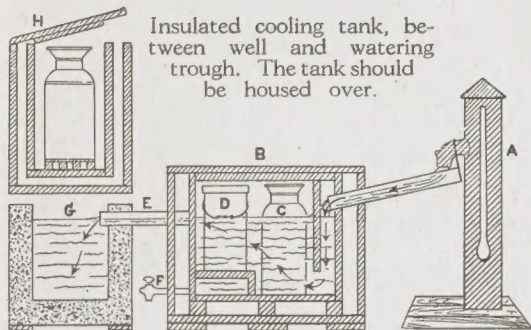
15—In warm weather put a clean wet blanket over the can when delivering it to the creamery or station.

16—Cleanliness and temperatures determine the length of time cream can be kept sweet.

COOLING OF CREAM

The most important part in the care of cream from the time of milking to the time the cream is delivered to the creamery is the quick and thorough cooling of the cream immediately after separating. This really is the secret, if we may call it that, of success in the production of high quality cream. More will depend upon how quickly it is cooled and how well it is cooled than upon any other one thing outside the other extremely important requirement of cleanliness.

An ample supply of cold water is of first importance for quick cooling. The efficiency of the cooling tank may be increased by adding ice to the water from the well, particularly during the hottest weather. Where water from the well must be depended upon entirely, it is necessary to renew the water in the cooling tank frequently enough to keep the cream in the cans down, as nearly as possible, to a temperature of 50°F. or below in summer and to keep it above freezing in the winter. How often the water must be changed will depend upon the temperature of the water used and existing weather conditions. A thermometer should always be kept at the cooling tank, in order that temperatures may be determined correctly. The loss from one can of cream being sour would pay for one or more thermometers.



- A. Pump.
- B. Cooling tank.
- C. Shipping can
- D. Plain shotgun can for collecting cream, raised from bottom of tank by 4 to 6 inch stand,
- E. Over-flow pipe to watering trough.
- F. Small pipe, with valve for emptying the tank to clean it.
- G. Watering trough.
- H. End view of tank.

DESCRIPTION OF TANK

The sides and bottom of the tank here shown are made by using 2 by 4-inch studding, putting paper and one ply of matched lumber on both the inside and the outside, and filling the four-inch space with dry mill shavings or sawdust. The tank is then lined with galvanized iron. There should be a three-quarter-inch pipe in the bottom of the tank, with a valve on it, to empty the tank when necessary. The depth of the tank and the height of the over-flow should be suited to the height of the cans. The cover of the tank is made of two plies of lumber, with damp-proof paper between, and is coated on the under side with shellac. Let the top ply of boards in the cover run lengthwise and the under ply crosswise of the tank. The inflow pipe should enter near the top of the tank and go nearly to the bottom.

WHY DO CREAM TESTS VARY?

This question perplexes every cream shipper. Most cream shippers have learned that, by proper adjustment of the cream screw, the per cent. of fat in the cream may be increased or decreased; but they may have noticed also that their cream tests have varied from two to ten per cent. or more from week to week or from season to season, even when the cream screw has not been changed. The farmer is apt to conclude that, when the milk is from the same herd and when there are no apparent irregularities in feeding, in milking and in separating of the cream, the per cent. of fat in the cream should not vary. The extreme variations in tests are likely to cause him to feel that the cream is not being accurately tested. But in reality, a uniform test from week to week would be more indicative of dishonesty than a variation of a few per cent. in the test. Occasionally an incorrect test is made; but this is an exceptional cause for variation rather than a usual one. All cream samples are required by law to be held 24 hours after testing by the creamery-man for rechecking by the government. A percentage of these samples are retested by officials of the Dairy Branch periodically, and very few inaccuracies are found. All milk and cream testers are licensed by the government, and if inaccuracies are found the tester's license is cancelled.

Factors affecting the per cent. of fat found in cream may be summarized as follows:

- 1—Speed at which the separator is turned.
- 2—Rate at which the milk is fed into the bowl.
- 3—Changes in temperature of the milk separated.
- 4—The richness of the milk separated.
- 5—Amount of skim-milk or water used in flushing the separator bowl.

Any one of these five phases of separator management will influence the test of cream, even when the cream screw has not been changed. However, if a variation in these conditions is avoided as much as possible, the richness of the cream may be controlled to a great extent.

Speed. The effect of speed of the separator bowl on the per cent. of fat in cream is probably greater than any other cause. The higher the speed the greater the centrifugal force; and the more rapidly the skim-milk will leave the bowl. Thus if the speed is increased the capacity of the skim-milk outlet increases, which leaves less milk for the cream outlet, consequently a richer cream results. Turning the separator six revolutions per minute below normal speed reduces the test 6%, or equal to about 1% for each revolution reduced. When the speed is increased six revolutions above normal, the per cent. of fat will increase about 6%, the difference in richness being greater when the machine is set for thick cream than when set for thin cream. The correct speed is usually stamped on the handle of the machine by the manufacturer; and from this there should be no variation in operation.

Rate at Which Milk is Fed. The amount of milk in the supply tank which enters the bowl affects the per cent. of fat in the cream. The more milk there is in the tank, the more rapidly will the milk flow through the bowl, on account of the pressure. If the tank is one-third full, the cream will be richer than when the tank is kept full. When the flow of milk from the supply tank is cut down below normal, the milk does not run through the separator as fast; therefore it is subjected to the centrifugal force for a longer time, causing a more complete separation, or in other words, more skim-milk is taken from the cream, causing a higher test. The float does not fully control the feed. Uniform feed is necessary for uniform results.

Temperature of Milk. The best time for separating milk is immediately after the milk is drawn from the cow. When the temperature of the air is cold, as in winter time, milk cools very rapidly. If the milk is allowed to cool much lower than 85° to 90°F., it should be warmed up before separating, thereby avoiding considerable loss of fat in the skim-milk and variation in the richness of the cream.

Changes in temperature of milk separated cause variations ordinarily from 3 to 4 per cent. of fat in the cream. The colder the milk separated, the richer the cream, but the greater the fat loss in the skim-milk.